Amendments to the Claims

 1. (Currently Amended) A method for monitoring a region of interest, the method comprising:

  (i) transmitting incident radiation towards the region of interest with a certain transmitting angle to define a plane of propagation of the incident radiation, and with a predetermined angular intensity distribution, $I(\theta)$, of the incident radiation, the region of interest being located within said plane;

  (ii) collecting reflections of the incident radiation with a solid angle of collection intersecting with said plane, a region of intersection being a detecting window of a predetermined geometry containing at least a portion of said region of interest; ~~(iii)~~ detecting the collected radiation coming from within said detecting window utilizing a detector having a sensing surface configured with a predetermined geometry and with a spatially variable sensitivity within this surface selected in accordance with the geometry of the detecting window and the angular intensity distribution of the incident radiation; and generating output signals indicative ~~thereof~~ the detected radiation.

 2. (Original) The method according to Claim 1, wherein said transmitting of the incident radiation provides propagation of the incident radiation upwards from the horizon, and said collecting is carried out with a field of view extending downwards from the horizon.

3. (Original) The method according to Claim 1, wherein the transmission of the incident radiation with the predetermined angular intensity distribution comprises the step of:

- passing radiation emitted by a radiation source through a beam-shaping element comprising at least one refractive block having a first active surface facing the radiation source, a second active surface, and an active medium enclosed therebetween, the first active surface of said at least one refractive block being formed by an array of facets, orientation of a surface region of the first active surface defined by each of the facets with respect to the second active surface and a length of said surface region being defined by the predetermined angular intensity distribution, $I(\theta)$, to be produced by radiation propagation through said at least one refractive block, θ being a steering angle created by the facet of the refractive block.

4. (Original) The method according to Claim 3, wherein the orientation of the surface region of the first active surface defined by each of the facets with respect to the second active surface and the length of said surface region are determined as follows:

- the predetermined angular intensity distribution, $I(\theta)$, is quantized into a discrete set of angles θ_i, each defining a tangential φ_i of said surface region by solving a following transcendental equation:

$$\theta_i = \arcsin[n\sin(\varphi_i - \arcsin(\frac{\sin\varphi_i}{n}))]$$

wherein θ_i is a specific angle of propagation of radiation ensuing from the ith facet;

- each of the facets is calculated taking into account that a projection of said surface region of each facet onto the second active surface is proportional to a relative output intensity at the corresponding angle.

5. (Original) The method according to Claim 3, wherein said array of facets of the refractive block is composed of two sets, which are symmetrically-identical with respect to a central axis of the refractive block.

6. (Currently Amended) The method according to Claim 1, wherein the detection of the reflections comprises:

- providing said desirably variable sensitivity distribution within a—the sensing surface of a—the detector, thereby providing substantially equal output signals of the detector irrespective of locations within the detecting window where the reflections are produced.

7. (Original) The method according to Claim 6, wherein the desirably variable sensitivity distribution is provided by forming the sensing surface with a pattern providing a desired sensitivity map within the sensing surface.

8. (Original) The method according to Claim 7, wherein said pattern is determined by performing an iteration algorithm for calculating a sensitivity filter function to be such as to provide substantially equal values of the output signals corresponding to the reflections of the incident

radiation coming from different locations in the detecting window.

9. (Original) The method according to Claim 8, wherein said iteration algorithm consists of determining, for each location in the detecting window, a corresponding value of PSF on the sensing surface; multiplying the determined PSF value by a transmission function $T_1(x,y)$ of the filter, and numerically integrating it over the entire sensing surface; repeating the same for an appropriate grid of locations in the detecting window; and correcting the transmission function $T_1(x,y)$ by normalizing it with respect to the calculated sensitivity map.

10. (Original) The method according to Claim 1, wherein the collection of the reflections of the incident radiation comprises collection of components of the reflections of the incident radiation propagating with angular segments of said solid angle of collection.

11. (Original) The method according to Claim 1, wherein the reflections of the incident radiation are collected with an additional solid angle of collection.

12. (Original) The method according to Claim 1, wherein the two solid angles of collection are symmetrically identical with respect to the plane of the detecting window.

13. (Original) The method according to Claim 9, and also comprising transmitting the incident radiation towards the region of interest with at least one additional transmitting angle and with a predetermined angular intensity distribution of the incident radiation, the additional transmitting angle intersection with the additional solid angle of collection in

said plane, thereby defining at least two detecting windows locating in the same plane and containing at least two portions of the region of interest, respectively.

14. (Currently Amended) A system for monitoring a region of interest, the system comprising:

    (a) a transmitter unit operable to transmit incident radiation with a certain transmitting angle defining a plane of propagation of the incident radiation and with a predetermined angular intensity distribution of the incident radiation, said region of interest being located within said plane; and

    (b) at least one receiver unit oriented and operable to collect reflections of the incident radiation with a certain solid angle of collection intersecting with said plane, a region of intersection being a detecting window of a predetermined geometry containing at least a portion of said region of interest, to detect the collected radiation coming from within said detecting window utilizing a detector having a sensing surface configured with a predetermined geometry and with a desirably spatially variable sensitivity within this surface selected in accordance with the geometry of the detecting window and the angular intensity distribution of the incident radiation, and generate data indicative thereof.

15. (Original) The system according to Claim 14, and also comprising at least one additional receiver unit.

16. (Original) The system according to Claim 15, wherein said at least one additional receiver unit collects the reflections of the incident radiation with a solid angle of collection symmetrically identical to said certain solid angle of collection with respect to said plane.

17. (Original) The system according to Claim 14, wherein the transmitter unit is oriented such that the incident radiation propagates towards the detecting window upwards from the horizon, and the receiver unit is oriented such that its field of view extends downwards from the horizon.

18. (Original) The system according to Claim 14, wherein the transmitter unit comprises a radiation source, a collimator, and a beam-shaping element.

19. (Original) The system according to Claim 14, wherein said beam-shaping element is of a refractive type comprising at least one refractive block having a first active surface facing the radiation source, a second active surface, and an active medium with a certain refraction index enclosed therebetween, the first active surface of said at least one refractive block being formed by an array of facets, orientation of a surface region of the first active surface defined by each of the facets with respect to the second active surface and a length of said surface region being defined by the predetermined angular intensity distribution, $I(\theta)$, to be produced by radiation propagation through said at least one refractive block, θ being a steering angle created by the facet of the refractive block.

20. (Original) The system according to Claim 19, wherein said array of facets of the refractive block is composed

of two sets, which are symmetrically identical with respect to a central axis of the refractive block.

21. (Original) The system according to Claim 19, wherein said beam-shaping element comprises at least one additional refractive block, scale and number of the refractive blocks depending on the distribution of radiation emitted by the radiation source within the first active surface of the beam-shaping element.

22. (Original) The system according to Claim 14, wherein the receiver unit comprises a spectral filter, a radiation collecting assembly, and a detector, which has a sensing surface with predetermined geometry and desirably variable sensitivity distribution.

23. (Original) The system according to Claim 14, wherein the sensing surface is divided into regions, each region receiving a corresponding one of solid angle segments of the solid angle of collection.

24. (Original) The system according to Claim 22, wherein the sensing surface is shaped and patterned in accordance with the geometry of the detecting window and its orientation with respect to an optical axis of propagation of the collected light.

25. (Original) The system according to Claim 22, wherein the geometry of the sensing surface is defined by a projection of the detecting window onto the sensing surface through said radiation collecting assembly.

26. (Original) The system according to Claim 22, wherein the sensing surface is made of silicone with a pattern

formed by ion implantation of boron thereby providing desired distribution of a transmission function of the sensing surface.

27.   (Original) The system according to Claim 22, wherein the sensing surface is covered with a mask providing desired distribution of a transmission function of the sensing surface.

28.   (Cancelled   in   response   to   Restriction Requirement Office Action)

29.   (Cancelled   in   response   to   Restriction Requirement Office Action)

30.   (New) The method according to Claim 1, wherein said sensing surface is oriented with respect to an optical axis of the detector at a certain non-right angle.

31.   (New) The system according to Claim 14, wherein said sensing surface is oriented with respect to an optical axis of the detector at a certain non-right angle.

32.   (New) A method for monitoring a region of interest, the method comprising:

    (i)   transmitting incident radiation towards the region of interest with a certain transmitting angle to define a plane of propagation of the incident radiation, the region of interest being located within said plane, and with a predetermined angular intensity distribution of the incident radiation achieved by passing radiation emitted by a radiation source through a beam-shaping element comprising

at least one refractive block having a first active surface facing the radiation source, a second active surface, and an active medium enclosed therebetween, the first active surface of said at least one refractive block being formed by an array of facets, orientation of a surface region of the first active surface defined by each of the facets with respect to the second active surface and a length of said surface region being defined by the predetermined angular intensity distribution, $I(\theta)$, to be produced by radiation propagation through said at least one refractive block, θ being a steering angle created by the facet of the refractive block, said orientation and said length being defined by quantizing the predetermined angular intensity distribution, $I(\theta)$, into a discrete set of angles θ_i, each defining a tangential φ_i of said surface region by solving a following transcendental equation

$\theta_i = \arcsin[n\sin(\varphi_i - \arcsin(\frac{\sin\varphi_i}{n}))]$, wherein θ_i is a specific angle of propagation of radiation ensuing from the ith facet, and calculating each of the facets taking into account that a projection of said surface region of each facet onto the second active surface is proportional to a relative output intensity at the corresponding angle

- 11 -

(ii)   collecting reflections of the incident radiation with a solid angle of collection intersecting with said plane, a region of intersection being a detecting window of a predetermined geometry containing at least a portion of said region of interest;

(iii)   detecting the collected radiation coming from within said detecting window and generating output signals indicative thereof.

33.   (New) A method for monitoring a region of interest, the method comprising:

(i)   transmitting incident radiation towards the region of interest with a certain transmitting angle to define a plane of propagation of the incident radiation, and with a predetermined angular intensity distribution, $I(\theta)$, of the incident radiation, the region of interest being located within said plane;

(ii)   collecting reflections of the incident radiation with a solid angle of collection intersecting with said plane, a region of intersection being a detecting window of a predetermined geometry containing at least a portion of said region of interest;

(iii)   detecting the collected radiation coming from within said detecting window and generating data indicative thereof, said detecting comprising providing desirably variable sensitivity distribution within a

sensing surface of a detector by forming the sensing surface with a pattern providing a desired sensitivity map within the sensing surface, thereby providing substantially equal output signals of the detector irrespective of locations within the detecting window where the reflections are produced, said pattern being determined by performing an iteration algorithm for calculating a sensitivity filter function to be such as to provide substantially equal values of the output signals corresponding to the reflections of the incident radiation coming from different locations in the detecting window, said iteration algorithm consisting of determining, for each location in the detecting window, a corresponding value of PSF on the sensing surface; multiplying the determined PSF value by a transmission function $T_1(x,y)$ of the filter, and numerically integrating it over the entire sensing surface; repeating the same for an appropriate grid of locations in the detecting window; and correcting the transmission function $T_1(x,y)$ by normalizing it with respect to the calculated sensitivity map.